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## Patents Form 1/77

Patents Act 1977  
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31MAR04 1885223-1 010086  
001/7700 0.00-0407206.2 ACCOUNT CHA

**Request for grant of a patent**

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

THE PATENT OFFICE  
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31 MAR 2004

NEWPORT

The Patent Office

Cardiff Road  
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1. Your reference

ESL 00210/GB/P1

31 MAR 2004

2. Patent application number

(The Patent Office will fill in this part)

0407206.2

3. Full name, address and postcode of the or of each applicant (underline all surnames)

ESL Healthcare Ltd  
Potts Marsh Industrial Estate  
Eastbourne Road  
Westham, East Sussex  
BN24 5NH

Patents ADP number (*if you know it*)

If the applicant is a corporate body, give the country/state of its incorporation

7032485002

United Kingdom

4. Title of the invention

SHOWER DRAINAGE

5. Name of your agent (*if you have one*)

Martin Hyden

"Address for service" in the United Kingdom to which all correspondence should be sent (*including the postcode*)

Rouse Patents  
Windsor House  
Cornwall Road  
Harrogate  
HG1 2PW  
United Kingdom

Patents ADP number (*if you know it*)

866159001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (*if you know it*) the or each application number

Country

Priority application number  
(*if you know it*)

Date of filing  
(*day / month / year*)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(*day / month / year*)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (*Answer 'Yes' if:*

- a) any applicant named in part 3 is not an inventor, or
  - b) there is an inventor who is not named as an applicant, or
  - c) any named applicant is a corporate body.
- See note (d))

## Patents Form 1/77

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Continuation sheets of this form

Description 5 ✓

Claim(s) 2 ✓

Abstract 1 ✓

Drawing(s) 5 + 8 ✓

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77) 1 ✓

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature



Date

Martin Hyden

22/03/04

12. Name and daytime telephone number of person to contact in the United Kingdom

Jane Polizzi/Anna Whitehead 01423 850800

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## SHOWER DRAINAGE

[0001] This invention relates to shower drainage. In particular it relates to drainage from showers that require pumping to drain water from the shower.

[0002] In conventional showers, water drains under the effect of gravity. This can occur because the shower tray is raised from floor level so as to be located above the drain into which water flows. Water flows out of the shower tray through a waste outlet and into a vertical or inclined pipe to a nearby drain. There are certain cases in which it is difficult or impossible to locate the shower tray sufficiently above the drain for gravity to cause water to flow properly into the drain. One such case is when a shower is installed for use by people who have difficulty in stepping up into a conventional raised shower tray, for example the elderly or physically disabled. In order to accommodate such people, it is desirable to mount the shower tray as close to floor level as possible, possibly flush with floor level. However, when this is done, it can be difficult to obtain sufficient vertical separation between the shower tray and the drain to achieve effective gravity drainage. Similar problems occur with wet floor bathrooms when the floor is gently sloped to a drain by grading the floor or by installing a Wet Floor Former, and a waterproof covering that is securely attached, typically by clamping around the drain.

[0003] One solution to the problem of difficult drainage by gravity is to fit a pump to the waste outlet from the shower to pump waste water into the drain at a rate sufficient to prevent the shower tray from filling with water. Examples of pumped waste systems for showers can be found in GB 1,532,953; GB 2,224,777; GB 2,276,541; GB 2,288,116; GB 2,294,636; GB 2,361,429 and GB 2,373,515.

[0004] GB 2,276,541 and GB 2,294,636 describe shower trays which have a recess into which water flows. An electric pump is located above the shower tray and sucks water from the recess by means of a pipe which projects into the recess from above. GB 1,532,953; GB 2,224,777; GB 2,288,116; GB 2,294,636; GB 2,361,429 and GB 2,373,515 describe

shower trays with a waste outlet through which water drains into a sump (chamber or gully trap), the water again being sucked therefrom through a pipe connected to an electric pump.

[0005] These systems suffer from a number of problems. A typical electrically heated shower can deliver water at 6-8 litres/minute. In order that the shower should not fill up and flood the room in which it is located, the pump must remove water at a rate no less than this and so the pump is typically rated at around 10-12 litres/minute. Such pumps are large, making it difficult to locate the pump below the shower tray. They are also noisy. As the pump draws at a rate greater than the water flows from the shower, it will also draw a large amount of air through the drainage system. This can lead to air locks forming in the system, preventing effective drainage, and causes more noise.

[0006] GB 2,224,777 proposes providing a sump below the shower tray and operating the pump only when sufficient water has entered the sump to activate an operating switch. In order to avoid the pump continuously switching on and off, it is necessary that the sump is relatively large and that there is a delay between the water level dropping low enough to deactivate the pump and the pump actually stopping. This makes installation difficult and can lead to oscillation when the shower is stopped as water draining back from the pump when it stops can be sufficient to reactivate the pump. The water draining out of the pump can still cause air lock problems. It has been proposed to mount the pump in the sump itself. However, the large physical size of the pump means that this can be difficult to install if there is limited vertical space available below the shower tray. The pump is also vulnerable to blockage by hair or the like, a problem common to most existing pumped-outlet shower systems.

[0007] It is an object of this invention to provide a pumped-outlet shower which does not suffer from some or all of these problems.

[0008] This invention attempts to address these problems by positioning a pump in the shower tray drain outlet so that the tray drains directly into the pump chamber.

[0009] A pump according to the invention comprises a pump chamber having an inlet for receiving water from the shower base and an outlet through which the water is pumped; characterised in that the inlet can be connected to the shower base such that the water drains directly into the pump chamber from the shower base.

[0010] The pump can have a motor mounted above or below the pump chamber. There can also be a filter cover mounted above the pump chamber to prevent blockage of the chamber. Where the motor is located above the pump chamber, it can be positioned so as to be entirely below the cover.

[0011] By positioning the pump chamber to receive water from the shower directly, the problems associated with the need to suck water from a sump are avoided. Thus the pump can be of lower power and problems of air locks are reduced. The preferred form of pump is a Centrifugal pump, although other forms of pump can also be used with the same benefits. The motor is mounted above the chamber, and drives the impeller by means of a drive shaft which passes through the shower drain outlet.

[0012] This pump can be used in a shower tray arrangement, with the pump chamber being optionally formed integrally with the shower tray, or in a wet-floor former in which a waterproof upper layer on the former is clamped to the pump.

[0013] The invention will now be described by way of examples, with reference to the accompanying drawings, in which:

Figure 1 shows a pump according to one embodiment of the invention;

Figure 2 shows an exploded view of the pump of Figure 1;

Figure 3 shows an underneath view of the pump of Figure 1;

Figure 4 shows the pump of Figure 1 installed in a shower tray; and

Figure 5 shows a separated view of the pump, cover and shower tray of Figure 4.

[0014] Referring now to the drawings, a pump according to one embodiment of the invention is shown in Fig 1, in exploded and part-

cutaway view. The pump comprises a sump body 10 formed from a moulded plastic material and having an open-topped, shaped pump chamber 12 and an outlet 14 defined therein. The sump body 10 is formed with a flange 16 allowing it to be secured in a shower drain hole as will be described below. A top plate 17 is fixed over the pump chamber 12. The top plate 17 has a hole 19 formed in a central region thereof. A motor housing 18 is provided for fixing on top of the top plate 17 and above the base of the shower (not shown) and enclosing an electric motor 20 (together with an associated electrical controller 21) which drives an impeller 22 located in the pump chamber 12 by means of a drive shaft 24 passing from the motor 20 through the hole 19. A cover 26 sits over the housing 18. The cover 26 is provided with apertures 27 for allowing water to drain through into the pump through the hole 19 but to catch and filter out items such as hair which might otherwise block the pump or drain.

[0015] A non-return valve 28 is positioned in the outlet 14 to prevent water flowing back into the pump chamber 12 when the pump is not active. In the present case, the valve 28 is in the form of a flap which is formed integrally with a resilient gasket 30 positioned between the sump body 10 and top plate 17.

[0016] The motor 20 is a low voltage electrical motor and is connected to a power supply in the normal manner (not shown). Sensors (not shown) are also provided in the pump chamber 12 for detecting the presence of water. These sensors can be used to automatically activate the pump when sufficient water has flowed from the shower to cover the impeller 22, and to stop the pump when the water falls below this level for any reason. The sensors can be of a number of different forms, for example a sensor probe extending down into the pump chamber 12 to a predetermined height above the base thereof, or spaced electrodes in the pump chamber.

[0017] In use, the sump body 10 sits in the drain hole 31 of a shower tray 32 and secured thereto by means of three fixing lugs in mounting blocks 33 from below (screws or any other suitable form of fastening, or a ring nut may also be used). A gasket 34 can be provided to seal the join and prevent water leakage around the outside of the pump.



The top plate 16, housing 18, motor 20 and impeller 22, and the cover 26 are connected as described above. The outlet 14 of the pump is connected to a waste pipe 36. It is particularly preferred that this pipe 36 be flexible in order to accommodate obstructions in the drainage path. The pipe 36 connects to a drain in the normal manner.

[0018] In an alternative construction, the sump body 10 is formed integrally with the shower tray 32, the remaining parts being connected as above.

[0019] While the embodiment described above refers to the use of the pump in a shower tray, other forms of shower bases can also be equipped with such a pump. One such base is known as a former and comprises base having a predetermined fall towards a drain hole and a water resistant floor covering secured on top of the former. A pump according to the invention can be used in this case by securing the sump body to the base and securing the floor covering around the drain hole by means of a clamp which connects through to the sump body 10.

[0020] A further embodiment of the invention has the motor mounted below the sump body 10 driving upwardly through the base thereof into the chamber 12. Such an arrangement is dependent on sufficient space being available to house the pump. This is not usually the case with normal electric motors. However, new designs of motor are becoming available which have relatively low profiles which may allow such an arrangement to be used. Even with this arrangement, the characteristic of the invention remains, namely that the shower drains directly into the pump chamber, with all of the benefits discussed previously.

[0021] Further changes can be made while staying within the scope of the invention.

## Claims

- 1 A pump for use with a shower base, comprising a pump chamber having an inlet for receiving water from the shower base and an outlet through which the water is pumped; characterised in that the inlet can be connected to the shower base such that the water drains directly into the pump chamber from the shower base.
- 2 A pump as claimed in claim 1, further comprising a filter cover mounted over the pump inlet.
- 3 A pump as claimed in claim 2, further comprising a motor mounted above the pump chamber and below the filter cover.
- 4 A pump as claimed in claim 3, wherein the motor is located above the level of the shower base.
- 5 A pump as claimed in claim 4, wherein the motor drives an impeller positioned in the pump chamber by means of a drive shaft which passes thorough a waste opening in the shower base through which water also drains into the pump chamber.
- 5 A pump as claimed in claim 1 or 2, further comprising a motor mounted below the pump chamber.
- 6 A pump as claimed in any preceding claim, further comprising sensors for detecting the presence of water in the pump, output from the sensors being used to operate the pump.
- 7 A pump as claimed in any preceding claim, comprising a non-return valve in the pump chamber.
- 8 A shower base unit having a drain opening and comprising a pump as claimed in any preceding claim connected directly to the drain opening.
- 9 A shower base unit as claimed in claim 8, wherein a filter cover is mounted over the drain opening, the pump being located below the drain cover.
- 10 A shower base unit as claimed in claim 8 or 9, comprising a tray.

- 11 A shower base unit as claimed in claim 10, wherein the pump chamber is formed integrally with the tray.
- 12 A shower base unit as claimed in claim 8 or 9, comprising a former having an upper waterproof layer which is clamped around the pump inlet.

ABSTRACT

A pump including a pump chamber having an inlet for receiving water from a shower base and an outlet through which the water is pumped; characterised in that the inlet can be connected to the shower base such that the water drains directly into the pump chamber from the shower base.

Figure 1

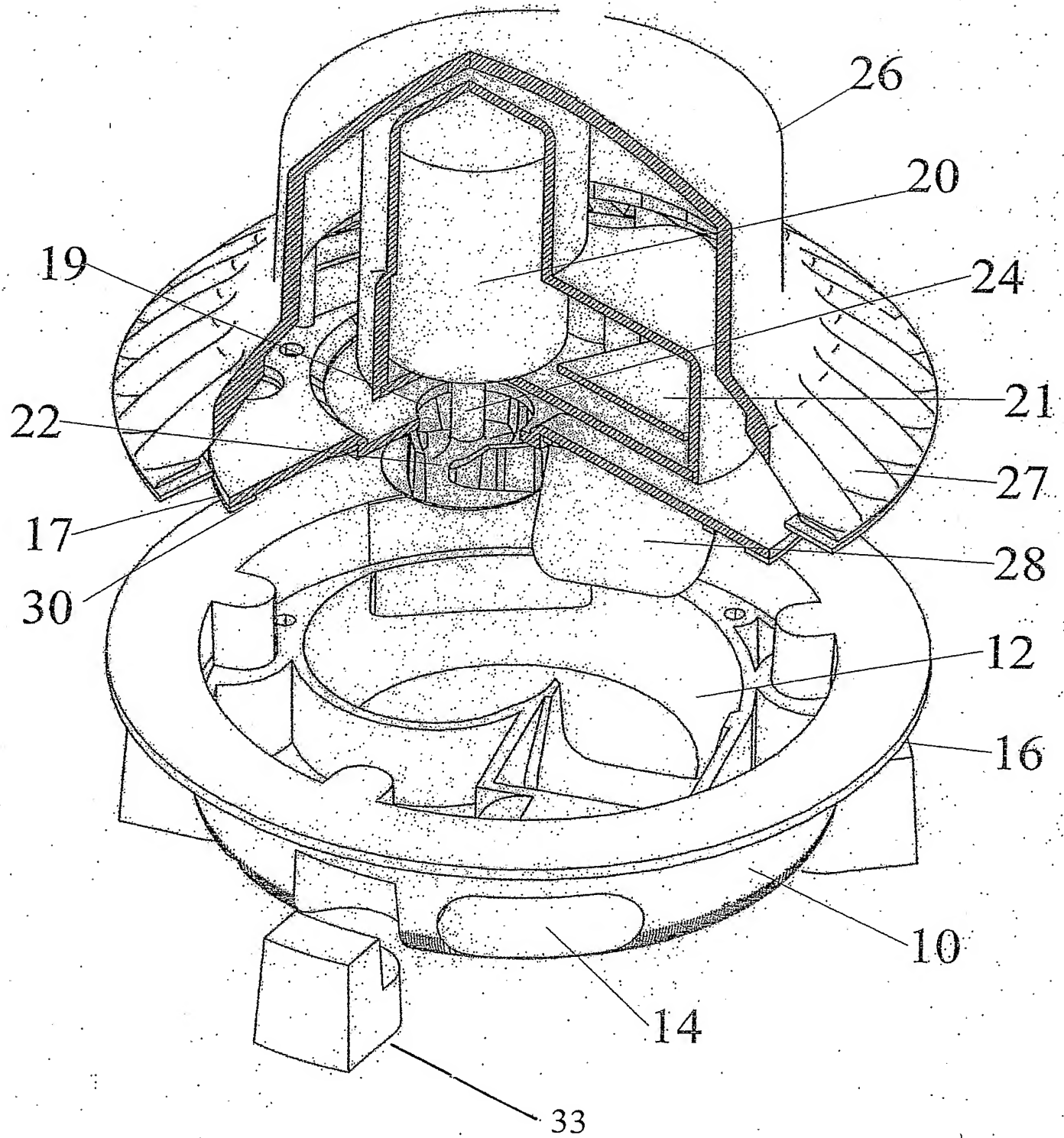
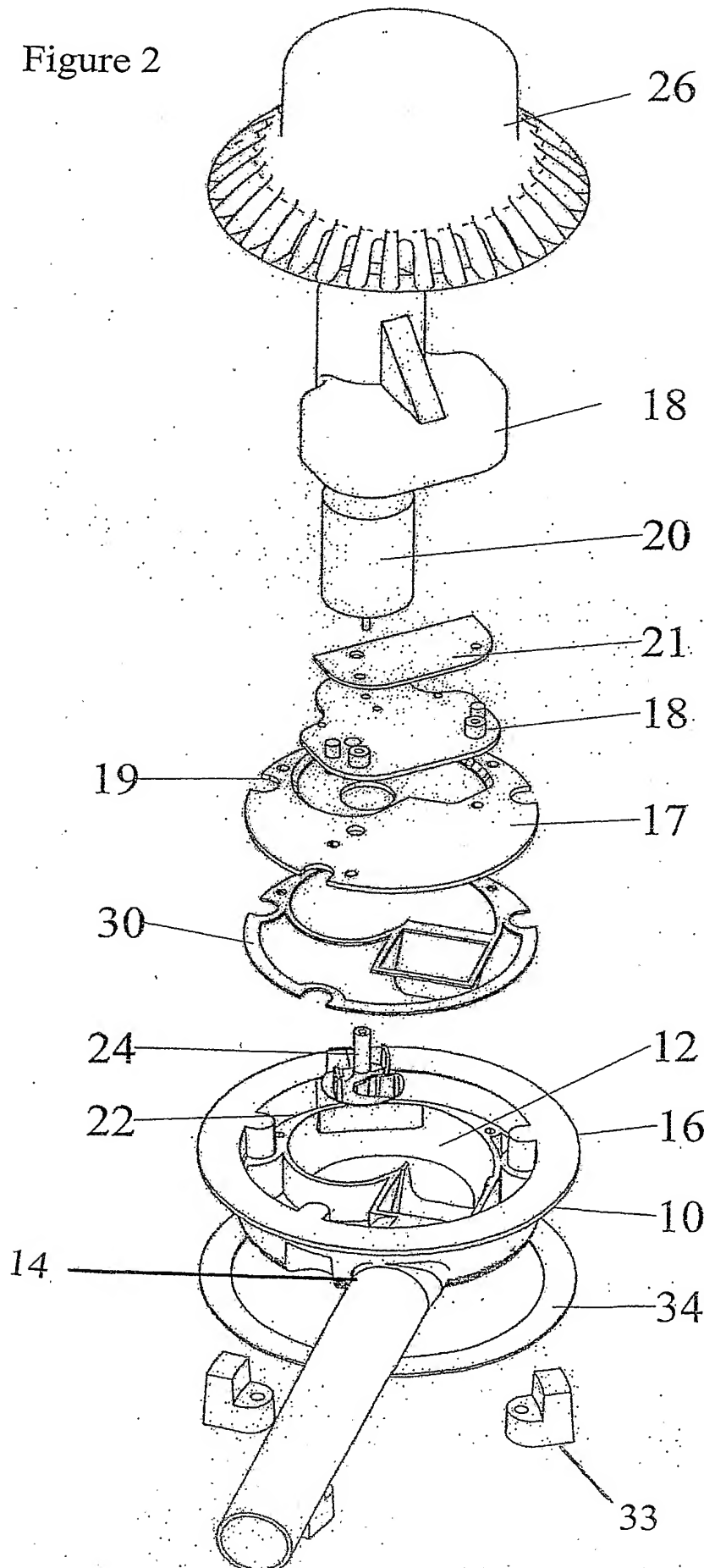




Figure 2







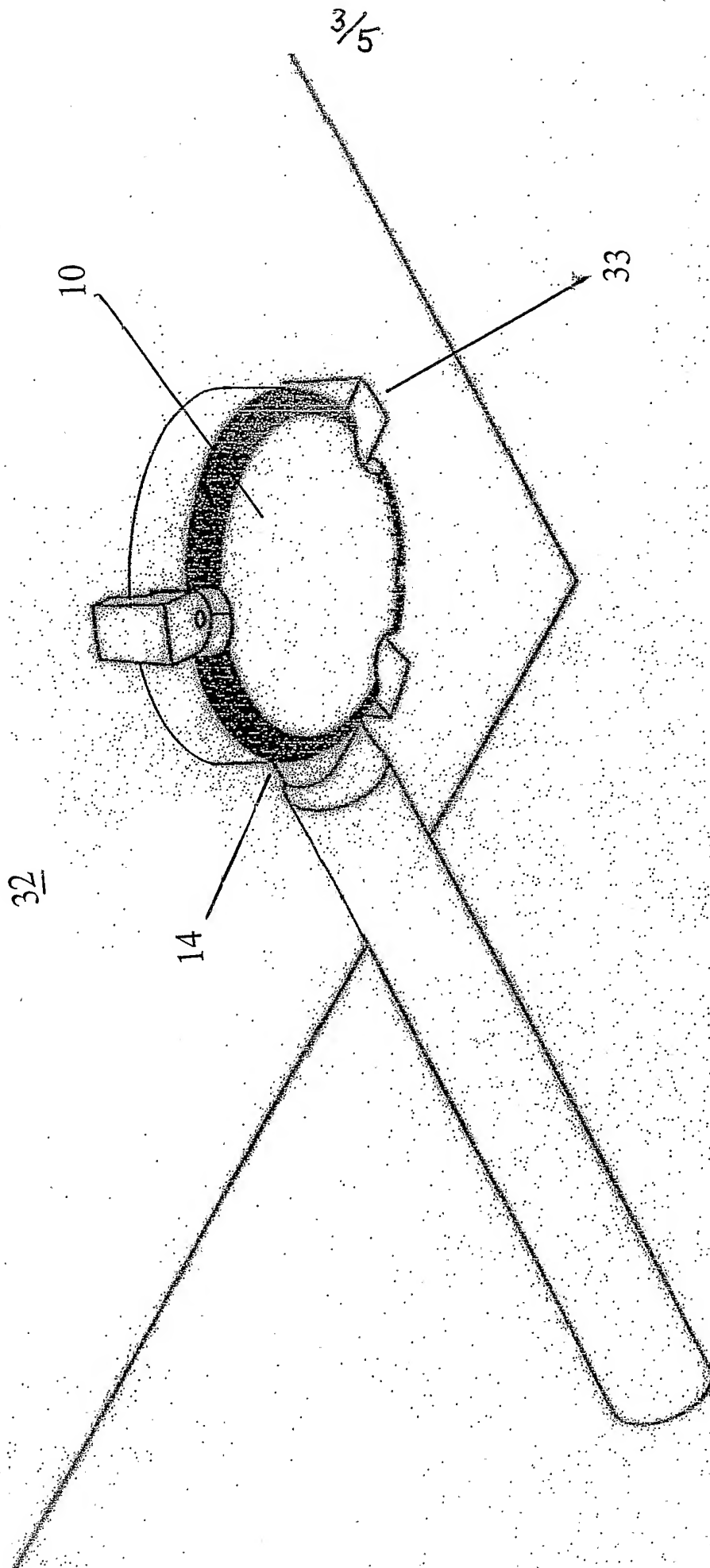


Figure 3



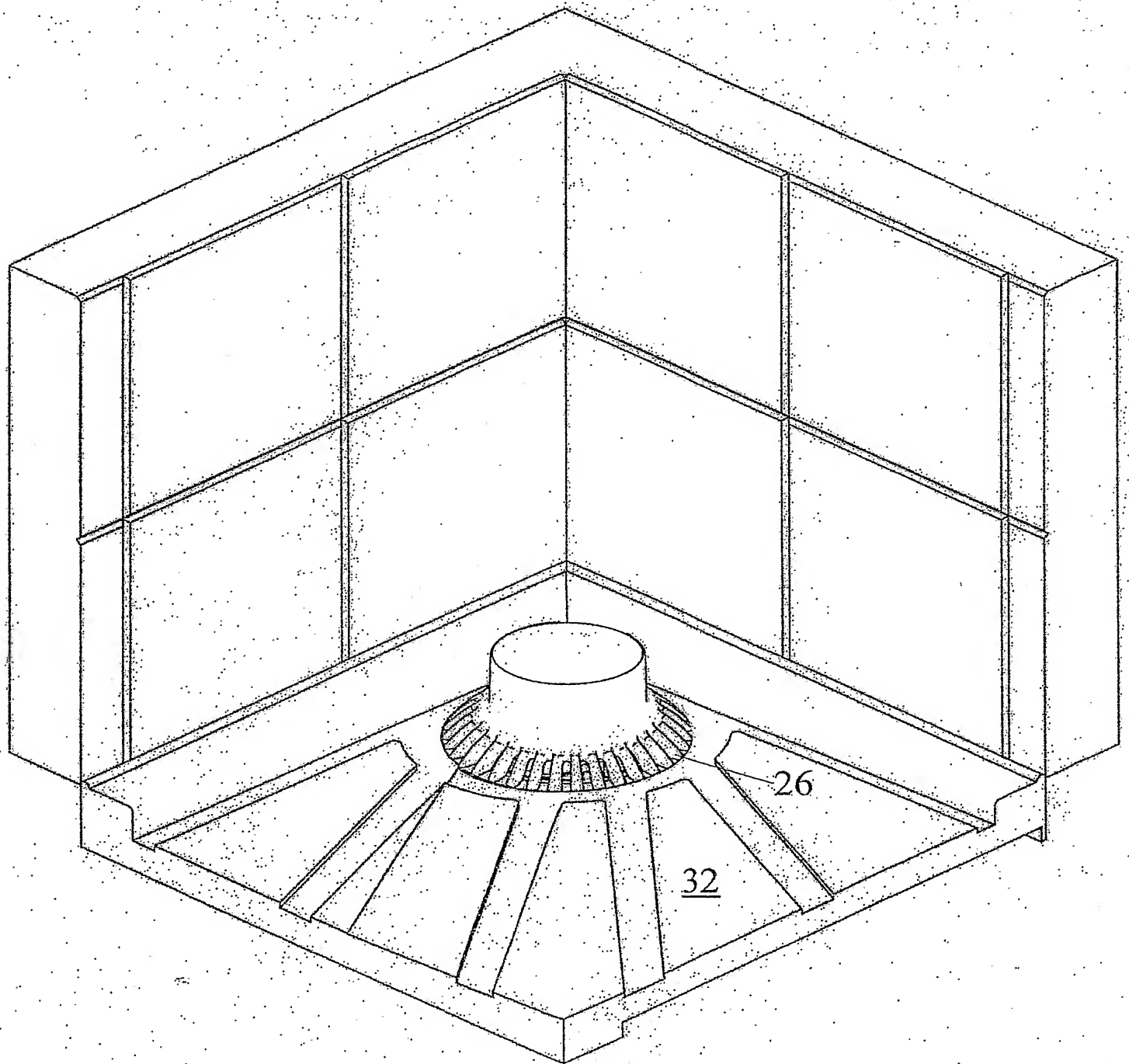


Figure 4



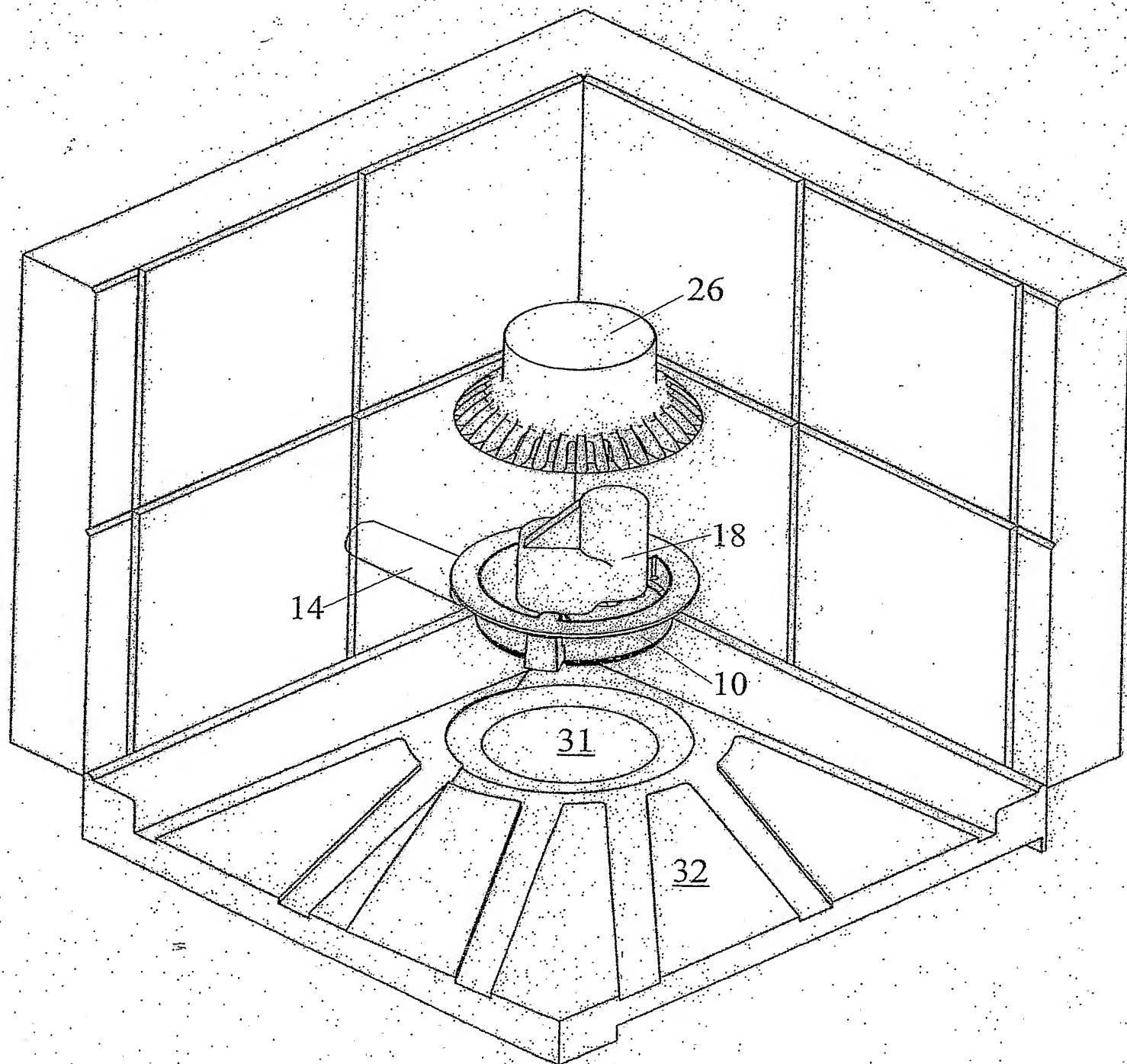


Figure 5



EP104 10005

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